CLAIMS:

1. A method for synchronizing a UWB receiver with an incoming UWB signal, comprising steps of:

receiving the incoming UWB signal;

generating a receiver signal at the UWB receiver;

analyzing the incoming UWB signal in light of the receiver signal to produce an analysis result;

comparing a parameter of the analysis result with a predetermined threshold to produce a comparison result; and

shifting a phase of said receiver signal when said parameter of said analysis result is beyond said predetermined threshold.

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2. The method according to claim 1, wherein the step of analyzing the incoming UWB signal comprises:

correlating the receiver signal with the incoming UWB signal, the analysis result being a correlation.

3. The method according to claim 2, wherein the predetermined threshold being a predetermined magnitude of the correlation.

4. The method according to claim 1, wherein the predetermined threshold being a predetermined signal to noise ratio.

5. The method according to claim 1, wherein the predetermined threshold being a predetermined bit error rate.

6. The method according to claim 1, wherein the predetermined threshold being a predetermined value of a lock parameter.

7. The method according to claim 1, further comprising a step of:

amplifying the received incoming UWB signal to produce an amplified incoming

UWB signal.

8. The method according to claim 7, wherein the step of amplifying comprises a step of:

maintaining a substantially constant magnitude of a correlation between the incoming UWB signal and the receiver signal.

9. The method according to claim 7, wherein the step of amplifying comprises a step of:

maintaining a substantially constant bit error rate.

10. The method according to claim 7, wherein the step of amplifying comprises a step of:

obtaining a substantially constant noise in the amplified incoming UWB signal.

11. The method according to claim 7, wherein said amplified incoming UWB signal being used as said incoming UWB signal in said step of analyzing.

12. The method according to claim 1, wherein the incoming UWB signal comprises at least one of bi-phase-modulated pulses and quadrature phase-modulated pulses.

13. The method according to claim 1, wherein the incoming UWB signal comprises multilevel pulses.

14. The method according to claim1, further comprising steps of:

changing a value of said predetermined threshold; and

repeating said steps of comparing and shifting using the changed predetermined threshold.

15. The method according to claim 1, further comprising a step of:

repeating said steps of analyzing, comparing, and shifting until said parameter of said analysis result is beyond said predetermined threshold.

16. The method according to claim 15, further comprising a step of:

changing a value of said predetermined threshold; and

repeating said step of repeating said steps of analyzing, comparing, and shifting until said parameter of said analysis result is beyond said predetermined threshold.

17. The method according to claim 16, further comprising a step of:

comparing said changed predetermined threshold with an extreme threshold; and

changing said predetermined threshold to an initial threshold value when said changed predetermined threshold is beyond said extreme threshold.

18. The method according to claim 1, wherein said step of analyzing the incoming UWB signal comprises a step of:

determining a lock parameter indicative of an average noise and an average signal strength.

19. The method according to claim 18, wherein said step of determining a lock parameter comprises:

calculating $L = sign(m_1 - Ks_1)$.

20. A system for synchronizing a UWB receiver with an incoming UWB signal, comprising:

an antenna configured to receive the incoming UWB signal;

a receiver signal generator configured to generate a receiver signal at the UWB receiver;

an analyzer configured to analyze the incoming UWB signal in light of the receiver signal to produce an analysis result;

a comparator configured to compare a parameter of the analysis result with a predetermined threshold to produce a comparison result; and

a phase shifter configured to shift a phase of the receiver signal when said parameter of said analysis result is beyond said predetermined threshold.

21. The system according to claim 20, wherein said analyzer comprises:

a correlator configured to correlate the receiver signal with the incoming UWB signal, the analysis result being a correlation.

22. The system according to claim 21, wherein the predetermined threshold comprises a predetermined magnitude of the correlation.

23. The system according to claim 20, wherein the predetermined threshold comprises a predetermined signal to noise ratio.

24. The system according to claim 20, wherein the predetermined threshold comprises a predetermined bit error rate.

25. The system according to claim 20, wherein the predetermined threshold comprises a predetermined value of a lock parameter.

26. The system according to claim 20, further comprising:

an amplifier configured to amplify the received incoming UWB signal to produce an amplified incoming UWB signal.

27. The system according to claim 26, wherein said amplifier further comprises:

a feedback loop configured to maintain a substantially constant magnitude of a correlation between the incoming UWB signal and the receiver signal.

28. The system according to claim 26, wherein said amplifier further comprises:

a feedback loop configured to maintain a substantially constant bit error rate.

29. The system according to claim 26, wherein said amplifier further comprises:

a feedback loop configured to maintain a substantially constant noise in the amplified incoming UWB signal.

30. The system according to claim 26, wherein said amplified incoming UWB signal

being used as said incoming UWB signal in said step of analyzing.

31. The system according to claim 20, wherein the incoming UWB signal comprises at least one of bi-phase-modulated pulses and quadrature phase-modulated pulses.

32. The method according to claim 20, wherein the incoming UWB signal comprises multilevel pulses.

33. The system according to claim 20, further comprising a subtractor configured to reduce said predetermined threshold by a given amount.

34. The system according to claim 21, wherein the correlator comprises:

a phase adjuster configured to adjust a phase of the local pulses; and

a calculator configured to calculate a correlation between the receiver signal and the incoming UWB signal.

35. The system according to claim 20, wherein the comparator comprises:

a location mechanism configured to locate a first phase angle at which said parameter of the analysis result is beyond said predetermined threshold;

a phase scan range setting mechanism configured to define a phase scan range relative to said first phase angle.

36. A system for synchronizing a UWB receiver with an incoming UWB signal, comprising:

means for receiving the incoming UWB signal;

means for generating a receiver signal at the UWB receiver;

means for analyzing the incoming UWB signal in light of the receiver signal to produce an analysis result;

means for comparing a parameter of the analysis result with a predetermined threshold to produce a comparison result; and

means for shifting a phase of the receiver signal when said parameter of said analysis result is beyond said predetermined threshold.

37. A method for synchronizing a UWB receiver with an incoming UWB signal, comprising steps of:

receiving the incoming UWB signal;

generating a receiver signal at the UWB receiver;

analyzing the incoming UWB signal in light of the receiver signal over a phase range less than 2π radians to produce an analysis result;

locating a desired phase angle within the phase range using the analysis result; and

shifting a phase of the receiver signal to the desired phase angle.

38. The method according to claim 37, wherein the step of analyzing the incoming UWB signal comprises:

correlating the receiver signal with the incoming UWB signal, the analysis result being a correlation.

39. The method according to claim 37, wherein the phase range being less than π radians.

40. The method according to claim 39, wherein the phase range being less than $\pi/2$ radians.

41. The method according to claim 40, wherein the phase range being less than $\pi/3$ radians.

42. The method according to claim 41, wherein the phase range being less than $\pi/4$ radians.

43. The method according to claim 42, wherein the phase range being less than $\pi/8$ radians.

44. The method according to claim 37, wherein the desired phase angle being an

angle with a maximum analysis result.

45. The method according to claim 37, wherein the desired phase angle being an angle with the analysis result above a threshold analysis result.

46. The method according to claim 37, wherein the analysis result being a correlation.

47. The method according to claim 37, wherein the analysis result being a bit error rate.

48. The method according to claim 37, wherein the analysis result being a signal to noise ratio.

49. The method according to claim 37, wherein the analysis result being a lock parameter.

50. The method according to claim 37, further comprising a step of:

amplifying the received incoming UWB signal to produce an amplified incoming UWB signal.

51. The method according to claim 50, wherein the step of amplifying comprises a step of:

maintaining a substantially constant magnitude of a correlation between the incoming UWB signal and the receiver signal.

52. The method according to claim 50, wherein the step of amplifying comprises a step of:

maintaining a substantially constant bit error rate.

53. The method according to claim 50, wherein the step of amplifying comprises a step of:

obtaining a substantially constant noise in the amplified incoming UWB signal.

54. The method according to claim 50, wherein said amplified incoming UWB signal being used as said incoming UWB signal in said step of analyzing.

55. The method according to claim 37, wherein the incoming UWB signal comprises at least one of bi-phase-modulated pulses and quadrature phase-modulated pulses.

56. The method according to claim 37, wherein the incoming UWB signal comprises multilevel pulses.

57. The method according to claim 37, further comprising steps of:

changing a value of said phase range; and

repeating said steps of comparing and shifting using the changed phase range.

58. The method according to claim 37, wherein said step of analyzing further comprises a step of:

scanning a phase range along a phase range vector to a vector maximum phase.

59. The method according to claim 58, further comprising a step of:

changing the vector maximum phase; and

repeating said step of scanning until said vector maximum phase is beyond a predetermined extreme vector maximum phase.

60. The method according to claim 58, wherein said step of changing the vector maximum phase comprises reducing the vector maximum phase.

61. The method according to claim 37, further comprising steps of:

analyzing the incoming UWB signal in light of the receiver signal over a complete phase range of 2π radians to produce an analysis result;

locating the desired phase angle within the complete phase range using the analysis result; and

shifting the phase of the receiver signal to the desired phase angle

62. The method according to claim 37, wherein the step of analyzing the incoming UWB signal comprises:

determining a lock parameter indicative of an average noise and an average signal strength.

63. The method according to claim 62, wherein said step of determining a lock parameter comprises:

calculating $L = sign(m_1 - Ks_1)$.

64. The method according to claim 37, wherein the step of analyzing the incoming UWB signal comprises:

determining a signal to noise ratio.

65. A system for synchronizing a UWB receiver with an incoming UWB signal, comprising:

an antenna configured to receive the incoming UWB signal;

a receiver signal generator configured to generate a receiver signal at the UWB receiver;

an analyzer configured to analyze the incoming UWB signal in light of the receiver signal over a phase range less than 2π radians to produce an analysis result;

a locator configured to locate a desired phase angle within the phase range using the analysis result; and

a phase shifter configured to shift a phase of the receiver to the desired phase angle.

66. The system according to claim 65, wherein said analyzer comprises:

a correlator configured to correlate the receiver signal with the incoming UWB signal, the analysis result being a correlation.

67. The system according to claim 65, wherein the phase range comprising a phase

range less than π radians.

68. The system according to claim 67, wherein the phase range comprising a phase range less than $\pi/2$ radians.

69. The system according to claim 68, wherein the phase range comprising a phase range less than $\pi/3$ radians.

70. The system according to claim 69, wherein the phase range comprising a phase range less than $\pi/4$ radians.

71. The system according to claim 70, wherein the phase range comprising a phase range less than $\pi/8$ radians.

72. The system according to claim 65, wherein the desired phase angle comprises an angle with a maximum analysis result.

73. The system according to claim 65, wherein the desired phase angle comprises an angle with the analysis result above a threshold analysis result.

74. The method according to claim 65, wherein the analysis result comprises a correlation.

75. The method according to claim 65, wherein the analysis result comprises a bit error rate.

76. The method according to claim 65, wherein the analysis result comprises a signal to noise ratio.

77. The method according to claim 65, wherein the analysis result comprises a lock parameter.

78. The system according to claim 65, further comprising:

an amplifier configured to amplify the received incoming UWB signal to produce an amplified incoming UWB signal.

79. The system according to claim 78, wherein said amplifier further comprises:

a feedback loop configured to maintain a substantially constant magnitude of a correlation between the incoming UWB signal and the receiver signal.

80. The system according to claim 78, wherein said amplifier further comprises:

a feedback loop configured to maintain a substantially constant bit error rate.

81. The system according to claim 78, wherein said amplifier further comprises:

a feedback loop configured to maintain a substantially constant noise in the amplified incoming UWB signal.

82. The system according to claim 78, wherein said amplified incoming UWB signal being used as said incoming UWB signal in said step of analyzing.

83. The system according to claim 65, wherein the incoming UWB signal comprises at least one of bi-phase-modulated pulses and quadrature phase-modulated pulses.

84. The method according to claim 65, wherein the incoming UWB signal comprises multilevel pulses.

85. The system according to claim 65, further comprising a range minimizer configured to reduce the scan range by a given amount.

86. The system according to claim 66, wherein the correlator comprises:

a phase adjuster configured to adjust a phase of the local pulses; and

a calculator configured to calculate a correlation between the receiver signal and the incoming UWB signal.

87. The system according to claim 65, wherein the locator further comprises:

a phase scan range setting mechanism configured to define the scan range relative to the desired phase angle.

88. A system for synchronizing a UWB receiver with an incoming UWB signal, comprising:

means for receiving the incoming UWB signal;

means for generating a receiver signal at the UWB receiver;

means for analyzing the incoming UWB signal in light of the receiver signal over a phase range less than 2π radians to produce an analysis result;

means for locating a desired phase angle within the phase range using the analysis result; and

means for shifting a phase of the receiver signal to the desired phase angle.